

Docket No.: H0610.0351/P351  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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In re Patent Application of:  
Jindrich Houzvicka et al.

Application No.: 10/663,647

Confirmation No.: 3795

Filed: September 17, 2003

Art Unit: 1764

For: C7+ PARAFFIN ISOMERISATION PROCESS  
AND CATALYST THEREFORE

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Examiner: R. Boyer

**APPELLANTS' REPLY BRIEF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This is a Reply Brief pursuant to 37 C.F.R. § 41.41 in response to the Examiner's Answer mailed April 15, 2009 in connection with the appeal from the final rejection of claims 1-5 mailed July 31, 2008 in the above-identified U.S. patent application.

**I. CLAIMS**

**A. Total Number of Claims in Application**

There are 5 claims pending in application. The application contains claims 1-5, which were finally rejected and are currently under appeal.

**B. Current Status of Claims**

1. Claims canceled: None
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: 1-5
4. Claims allowed: None
5. Claims rejected: 1-5

**C. Claims On Appeal**

The claims on appeal are claims 1-5.

**II. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Whether the rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over Chang (U.S. Patent No. 6,080,904) in view of J. C. Yori et al., *Isomerization of n-Butane on Pt/SO<sub>4</sub><sup>2-</sup>-ZrO<sub>2</sub> and Mechanical Mixtures of Pt/Al<sub>2</sub>O<sub>3</sub> + SO<sub>4</sub><sup>2-</sup>-ZrO<sub>2</sub>*, 153 J. CATAL. 218-223 (1995) should be reversed.

Whether the rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over S. Zhang et al., *Anion-Modified Zirconia: Effect of Metal Promotion and Hydrogen Reduction on Hydroisomerization of n-Hexadecane and Fischer-Tropsch Waxes*, 69 FUEL PROC. TECH. 59-71 (2001) in view of J. C. Yori et al., *Isomerization of n-Butane on Pt/SO<sub>4</sub><sup>2-</sup>-ZrO<sub>2</sub> and Mechanical Mixtures of Pt/Al<sub>2</sub>O<sub>3</sub> + SO<sub>4</sub><sup>2-</sup>-ZrO<sub>2</sub>*, 153 J. CATAL. 218-223 (1995) should be reversed.

**III. ARGUMENT**

Although the Examiner's Answer does not raise any new grounds for rejection, Appellants briefly respond to the Examiner's remarks regarding Appellants' arguments in the Appeal Brief. Appellants incorporate all comments from Appellants' Appeal Brief dated February 17, 2009. Appellants provide the following comments in response to the Examiner's arguments on pages 4-14 of the Examiner's Answer.

THE CITED PRIOR ART REFERENCES DO NOT DISCLOSE OR  
SUGGEST ALL LIMITATIONS OF THE CLAIMED INVENTION

In the Examiner's Answer, the Examiner fails to address the fact that claim 1 does not recite the fully open term "comprising" but rather the narrower, closed term "consisting of" to better reflect that the four specified components (i.e., aluminum oxide, zirconium oxide, tungsten oxyanion, and platinum and/or palladium) are essential, rather than incidental. Appellants reemphasize that the "consisting of" language of claim 1 limits the catalyst composition to the specified components.

In the Examiner's Answer, the Examiner states that "Chang discloses . . . a catalyst composition consisting of zirconium oxide modified with tungsten oxyanion and hydrogenation component of a Group VIII metal" pointing out to the Abstract of Chang (Examiner's Answer at 4; emph. added). Appellants submit that this statement is incorrect.

First, the Abstract of Chang refers to a catalyst "comprising a hydrogenation/dehydrogenation component . . . and an acid solid component" and not "consisting of," as in the claimed invention (emph. added). Second, there is no indication in Chang that its catalyst is restricted to only the elements enumerated by the Examiner (i.e., to "zirconium oxide modified with tungsten oxyanion and hydrogenation component of a Group VIII metal"). In fact, Chang teaches that its catalyst can include a variety of compounds, noting that:

The catalyst described herein comprises an oxide of a Group IVB metal, preferably zirconia or titania. This Group IVB metal oxide is modified in two ways. According to one modification, the Group IVB metal oxide is modified with an oxyanion of a Group VIB metal, such as an oxyanion of tungsten, such as tungstate. The modification of the Group IVB metal oxide with the oxyanion of the Group VIB metal imparts acid functionality to the material. The modification of a Group IVB metal oxide, particularly, zirconia, with a Group VIB metal oxyanion, particularly tungstate, is described in U.S. Pat. No. 5,113,034; in Japanese Kokai Patent Application No. Hei 1 [1989]-288339; and in an article by K. Arata and M. Hino in Proceedings 9th International Congress on Catalysis, Volume 4, pages 1727-1735

(1988), the entire disclosures of these publications are expressly incorporated herein by reference.

Chang, col. 2, ll. 18-35.

Thus, Chang does not disclose “a catalyst composition consisting of zirconium oxide modified with tungsten oxyanion and hydrogenation component of a Group VIII metal,” as the Examiner asserts (emph. added).

With respect to the rejection of claims 1-5 in view of Zhang and Yori, the Examiner also asserts that “Zhang discloses . . . a catalyst composition consisting of zirconium oxide modified with tungsten oxyanion and hydrogenation component of a Group VIII metal,” also pointing out to the Abstract of Zhang. (Examiner’s Answer at 6; emph. added). Appellants disagree.

Again, nowhere in Zhang is there any indication that the catalyst of Zhang is – or could be – restricted to the components enumerated by the Examiner (i.e., “zirconium oxide modified with tungsten oxyanion and hydrogenation component of a Group VIII metal”). In fact, Zhang specifically teaches that the “effect of metal promoters on the activity and selectivity of tungstated zirconia . . . by using different metals (Pt, Ni, and Pd)” (abstract). Thus, like Chang, Zhang does not disclose “a catalyst composition consisting of zirconium oxide modified with tungsten oxyanion and hydrogenation component of a Group VIII metal,” as the Examiner asserts (emph. added).

For at least the reasons above, Appellants submit that any combination of Chang and Yori, or of Zhang and Yori, simply does not disclose or suggest all “essential” elements of independent claim 1, i.e., a catalyst composition “consisting of mixed aluminum and zirconium oxides modified with tungsten oxyanion and platinum and/or palladium” (emph. added).

#### NO MOTIVATION TO COMBINE THE REFERENCES EXISTS

In the “Response to Argument” section of the Examiner’s Answer, the Examiner asserts that a person of ordinary skill in the art would have been motivated to combine Yori with Chang or Zhang as “sulfate and tungstate are art-recognized substitute anions for use as catalyst modifying

materials in hydrocarbon conversion catalysts" (Examiner's Answer at 8). Based on this conclusion, the Examiner then asserts throughout the entire Examiner's Answer that "the sulfate anion of Yori's catalyst is an *art-recognized equivalent* for the tungstate anion of Zhang's and Chang's catalyst" (Examiner's Answer at 11, 12, 13, 14). Appellants disagree with the Examiner's conclusion and all subsequent assertions for at least the following three reasons:

First, Zhang does not teach that "sulfate and tungstate are art-recognized substitute anions for use as catalyst modifying materials in hydrocarbon conversion catalysts," as the Examiner asserts. Rather, Zhang only states (in the "Introduction" section) that "[T]he high catalytic activity of anion-modified zirconia-based catalysts such as sulfated or tungstated zirconia ( $\text{SO}_4^{2-}/\text{ZrO}_2$ ,  $\text{WO}_3/\text{ZrO}_2$ ) for hydrocarbon conversion at mild conditions is known" (Zhang at 60). Thus, Zhang teaches only that sulfated or tungstated zirconia are examples of anion-modified zirconia-based catalysts (Zhang at 60). Zhang does not teach, however, that they are substitutes for each other or that the addition of various elements or promoters to these anion-modified zirconia-based catalysts yields similar results. In fact, Zhang teaches the opposite. On page 60, Zhang fully explains that different promoters have been proposed for the anion-modified zirconia-based catalysts but emphasizes that the results have been unpredictable particularly because "the role of these promoters is still unclear" (see, e.g., the first full paragraph on page 60 of Zhang explaining the promotion with metals, or prereduction with hydrogen, or addition of olefins, etc.). Thus, Examiner's conclusion that the sulfate and tungstate are art-recognized substitute anions for hydrocarbon conversion catalysts is unsupported; Zhang merely teaches that sulfate and tungstate zirconia are only examples of anion-modified zirconia-based catalysts and that their catalytic activity is known.

Second, Zhang itself teaches (and the Examiner acquiesces) that "[T]his [tungstate-modified] catalyst was much more selective for isomerization than the Pt-promoted sulfated zirconia" (Zhang at 65). Thus, according to Zhang, sulfate and tungstate zirconia catalysts (even though they are examples of anion-modified zirconia-based catalysts) have different catalytic

activity. This statement in itself fails to support the Examiner's assertion that sulfate and tungstate are art-recognized equivalent anions for hydrocarbon conversion catalysts.

Third, the motivation to combine the references (to arrive at the claimed invention) must be found in the prior art and not in inventor's own disclosure. The Examiner relies upon the teachings of the instant application to provide motivation to modify the teachings of the cited prior art references to arrive at the claimed invention. Appellants submit that it is improper to use applicant's own disclosure as a roadmap for modifying references. "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and *not based on applicant's disclosure.*" *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991); MPEP § 706.02(j) (emphasis added). In addition, "[T]he initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done." MPEP § 706.02(j). "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner *must present a convincing line of reasoning* as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Id.* (quoting *Ex parte Clapp*, 227 USPQ 972, 973 (BPAI 1985) (emphasis added)).

In the present case, Chang and Zhang do not expressly or impliedly suggest the claimed invention, and Yori does not disclose or suggest the addition of aluminum to a composition of zirconium oxide modified with tungsten oxyanion. Rather, Yori teaches addition of alumina to a sulphate compound (i.e.,  $\text{SO}_4^{2-} - \text{ZrO}_2$ ), which is not an "art-recognized substitute" of zirconium oxide modified with tungsten oxyanion (as the Examiner asserts), but rather a compound completely different from zirconium oxide modified with tungsten oxyanion. Even if *arguendo* these sulfate and tungstate would be art-recognized substitute anions, there is still no motivation to add the aluminum of Yori to the combined teachings of either Chang or Zhang, as the sulfate and tungstate zirconia catalysts have different catalytic activity (see the reasons above). Yori also does not teach enhanced catalytic activity by adding aluminum to a catalyst. Yori simply states that Pt/aluminum has a pure a selectively in the isomerisation of  $\text{C}_{4+}$  (page 222, second paragraph). Accordingly,

even if a person of ordinary skill in the art would *arguendo* have been motivated to combine Yori with either Chang or Zhang, one skilled in the art would still not expect an enhanced catalytic activity (as the Examiner asserts) by adding aluminum to the catalyst of Chang or Zhang.

#### IV. CONCLUSION

The Examiner's rejection of claims 1-5 on prior art grounds should be reversed for the reasons set forth above and in the Appellants' Appeal Brief submitted on February 17, 2009.

Dated: June 15, 2009

Respectfully submitted,

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